IN THE CLAIMS

1. (currently amended) An integrated cross-switching unit, which is used for ~~SDH~~ Time Division Multiplexing (TDM) system comprising a~~n~~ ~~SDH~~TDM line unit and a data service processing unit, comprising:

a bus identification module;

a cross-connecting module;

a mapping/de-mapping module;

an encapsulation/de-encapsulation module; and

a packet scheduling module; wherein

the bus identification module transmits the data service and/or TDM service from the ~~SDH~~ TDM line unit to the cross-connecting unit and transmits the data service from the data service processing unit to the packet scheduling module;

the cross-connecting module implements cross-scheduling for time slots of the TDM service, and schedules the time slots corresponding to the data service from the ~~SDH~~ TDM line unit to the mapping/de-mapping module;

the mapping/de-mapping module receives data frames from the cross-connecting module, and implements ~~mapping~~ mapping/de-mapping for the data from the encapsulation/de-encapsulation module;

the encapsulation/de-encapsulation module receives the data frames from the mapping/de-mapping module, implements data link layer de-encapsulation, and encapsulates the packets from the packet scheduling module;

the packet scheduling module receives the data packets from the encapsulation/de-encapsulation module and/or the bus identification module to implement label-based packet scheduling; transmitting the scheduled data to the data service processing unit via packet bus or to the ~~SDH~~ TDM line unit via the encapsulation/de-encapsulation module, the mapping/de-mapping module and the cross-connecting unit in turn.

2. (original) The integrated cross-switching unit according to claim 1, wherein a plurality of physical channels are configured between the mapping/de-mapping module and the encapsulation/de-encapsulation module, and between the encapsulation/de-encapsulation module and the packet scheduling module.

3. (original) The integrated cross-switching unit according to claim 2, wherein the plurality of physical channels are configured with different encapsulation protocols respectively.

4. (original) The integrated cross-switching unit according to claim 2, wherein for the GFP frames from different physical channels, the encapsulation/de-encapsulation module finds CID field in the extended header of each GFP frame and directly forwards the data frame with the CID field into the corresponding physical channel.

5. (currently amended) An integrated cross-switching unit, which is used for ~~SDH~~ TDM system including a~~n~~ ~~SDH~~TDM line unit and a data service processing unit, comprising:

a bus identification module;

a high-order cross-connecting module;

a high-order mapping/de-mapping module;

a high-order encapsulation/de-encapsulation module;

a high-order packet scheduling module;

a low-order cross-connecting module;

a low-order mapping/de-mapping module;

a low-order encapsulation/de-encapsulation module; and

a low-order packet scheduling module; wherein

the bus identification module transmits the data service and/or TDM service from the ~~SDH~~ TDM line unit to the high-order cross-connecting module, and transmits the data service from the data service processing unit to the high-order packet scheduling module;

the high-order cross-connecting module schedules the service as required for low-order processing to the low-order cross-connecting module, implements cross-scheduling for time slots of high-order TDM service, and schedules the time slots corresponding to the high-order data service from the ~~SDH~~ TDM line unit to the high-order mapping/de-mapping module;

the low-order cross-connecting module implements cross-scheduling for time slots of low-order TDM service, and schedules the time slots corresponding to the low-order data service from the ~~SDH~~ TDM line unit to the low-order mapping/de-mapping module;

the high-order and low-order mapping/de-mapping modules receive the data frames from the high-order and low-order cross-connecting modules correspondingly, and implement mapping-/de-mapping for the data from the high-order and low-order encapsulation/de-encapsulation modules respectively;

the high-order and low-order encapsulation/de-encapsulation modules receive the data frames from the high-order and low-order mapping/de-mapping modules correspondingly, implement data link layer de-encapsulation, and encapsulate the packets from the high-order and low-order packet scheduling modules respectively;

the high-order packet scheduling module receives the data packets from the high-order encapsulation/de-encapsulation module and/or the bus identification module and implements label-based packet scheduling; transmits the scheduled data to the data service processing unit via packet bus or to the ~~SDH~~ TDM line unit via the high-order encapsulation/de-encapsulation module, the high-order mapping/de-mapping unit and the high-order cross-connecting module in turn;

the low-order packet scheduling module receives the data packets from the low-order encapsulation/de-encapsulation module and implements label-based packet scheduling; transmits the scheduled data to the ~~SDH~~ TDM line unit via the low-order encapsulation/de-encapsulation module, the low-order mapping/de-mapping unit and the low-order cross-connecting module in turn.

6. (currently amended) A service scheduling method ~~implemented by the integrated cross-switching unit of claim 1~~, comprising the steps of:

A) a bus identification module transmitting the data service and/or TDM service from the ~~SDH~~ TDM line unit to the cross-connecting module, and going to step B); transmitting the data service from the data service processing unit to the packet scheduling module, and going to step C);

B) the cross-connecting module implementing cross-scheduling for time slots of the TDM service, and transmitting the scheduled data to the ~~SDH~~ TDM line unit; or scheduling the time slots corresponding to the data service from the ~~SDH~~ TDM line unit to the mapping/de-mapping module, the encapsulation/de-encapsulation module receiving the data service from the mapping/de-mapping module and transmitting the data service to the packet scheduling module, and going to step C);

C) the packet scheduling module implementing packet scheduling for the data service; transmitting the scheduled data to the data service processing unit via packet bus, or to the ~~SDH~~ TDM line unit via the encapsulation/de-encapsulation module, the mapping/de-mapping module and the cross-connecting module in turn.

7. (original) The service scheduling method according to claim 6, wherein the bus identification module reports the slot number corresponding to the data service processing unit and unit type of the data service processing unit to the control unit via the data service processing unit, and identifies the type of the bus connected with the processing unit as backplane packet bus to identify service source.

8. (currently amended) The service scheduling method according to claim 6, wherein the ~~SDH~~ TDM line unit and the data service processing unit copy the service to a first integrated cross-switching unit and a second integrated cross-switching unit which have the same function and structure to implement the same service scheduling procedure; if the first integrated cross-switching unit and the second integrated cross-switching unit are both normal, the ~~SDH~~ TDM line unit and the data service processing unit receive the same service streams from the first integrated cross-switching unit and the second integrated cross-switching unit , and select either of them to implement a processing based on the service streams; if either of the first integrated cross-switching unit and the second integrated cross-switching unit goes wrong, the faulted integrated cross-switching unit reports to the control unit, and the control unit instructs the ~~SDH~~ TDM line unit and the data service processing unit to select the service stream of the normal integrated cross-switching unit.

9. (currently amended) The service scheduling method according to claim 6, wherein the ~~SDH~~ TDM line unit and the data service processing unit copy the service to the first integrated cross-switching unit and the second integrated cross-switching unit which have the same function and structure to implement the same service scheduling procedure; the ~~SDH~~ TDM line unit and the data service processing unit receive the same service streams from the first integrated cross-switching unit and the second integrated cross-switching unit , determine whether the two service streams are normal, and select either of them and implement a processing based on the service streams if the two service streams are both normal; if either of them is abnormal, select the normal service stream.

10. (currently amended) The service scheduling method according to claim 6, wherein the ~~SDH~~ TDM line unit and the data service processing unit allocate the service to the first integrated cross-switching unit and the second integrated cross-switching unit which have the same function and structure to implement service scheduling; if the first integrated cross-switching unit and the second integrated cross-switching unit are both normal, the ~~SDH~~ TDM line unit and the data service processing unit receive the service streams from the first integrated cross-switching unit and the second integrated cross-switching unit to implement a processing based on the service streams; if either of the first integrated cross-switching unit and the second integrated cross-switching unit goes wrong, the faulted integrated cross-switching unit reports to the control unit, and the control unit instructs the ~~SDH~~ TDM line unit and the data service processing unit to switch the service allocated to the faulted integrated cross-switching unit to the normal integrated cross-switching unit.

11. (currently amended) The service scheduling method according to claim 6, wherein the ~~SDH~~ TDM line unit and the data service processing unit allocate the service to the first integrated cross-switching unit and the second integrated cross-switching unit which have the same function and structure to implement service scheduling; the ~~SDH~~ TDM line unit and the data service processing unit receive the service streams from the first integrated cross-switching unit and the second integrated cross-switching unit and determine whether the service streams are normal; if either of the service streams is abnormal, switch the service of the integrated cross-switching unit corresponding to the abnormal service stream to the normal integrated cross-switching unit.

12. (currently amended) The service scheduling method according to claim 9~~or 10~~, wherein the service allocated to the first integrated cross-switching unit and the second integrated cross-switching unit has priority; when either of the integrated cross-switching units goes wrong and needs service switching, the high-priority service can substitute the low-priority service under processing.

13. (new) The service scheduling method according to claim 10, wherein the service allocated to the first integrated cross-switching unit and the second integrated cross-switching unit has priority; when either of the integrated cross-switching units goes wrong and needs service switching, the high-priority service can substitute the low-priority service under processing.

14. (new) The integrated cross-switching unit according to claim 6, wherein the TDM line unit is a synchronous digital hierarchy or synchronous optical network line unit.